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ABSTRACT

Data from the National Education Longitudinal Survey (NELS) are used to examine the relationship between minimum competency testing and dropout rates. Proponents of such testing have argued that minimum competency tests provide incentives for schools and students, but opponents have argued that such tests lead to a low-level basic skills curriculum and increase dropout rates by discouraging low-scoring students from continuing in school. The focus is on eighth-grade testing, specifically tests that students must pass to be promoted to the ninth grade. Students in urban schools and in schools with high concentrations of low-income and minority students are more likely to face minimum competency test requirements. Longitudinal data from the 1988 and 1990 NELS show that in schools with high concentrations of low socioeconomic status students, minimum competency requirements are linked to sharply higher dropout rates. Once socioeconomic composition is taken into account, schools with below average student grades, low attendance rates, and high concentrations of minority students and students who are above age for their grade display no further systematic relationship between minimum competency testing policies and dropout rates. More detailed analysis for students surveyed in 1988 and 1990, in a final sample of 720 schools, confirms the relationship of minimum competency testing and dropping out for low and moderately low socioeconomic status schools, although they do not give clear evidence of causality. (Contains 6 tables, 4 figures, and 17 references.) (SLD)

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Eighth Grade Minimum Competency Testing and Early High School Dropout Patterns

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April, 1996

Minimum competency testing—the practice of requiring students to pass a test in order to be promoted from grade to grade or to graduate from high school—has grown increasingly common in U.S. public schools in the last two decades, despite a lack of substantial empirical evidence about its effectiveness. In the absence of concrete empirical evidence, proponents and opponents of minimum competency testing have argued, sometimes vehemently, over the probable consequences of conditioning grade promotion or graduation on test results. While proponents of the tests have generally argued that such requirements provide incentives for students and schools, particularly those at the low end of the achievement spectrum, to improve their performance, opponents have argued that the tests lead to a low-level basic skills curriculum and increase dropout rates by discouraging students who fail the tests from continuing in school. This paper uses data from the National Educational Longitudinal Survey (NELS) to examine one area of this debate—the relationship between minimum competency testing and dropout rates.

Before the late 1970's, few states and districts required minimum competency tests (MCTs). By 1984, however, 19 states required students to pass minimum competency tests in order to graduate from high school (Winfield, 1991), and 24% of all tests given in U.S. public schools were used for grade promotion or graduation (United States General Accounting Office, 1993). The proliferation of

minimum competency testing grew with demands for public accountability of schools through the 1970s and 1980s, driven by a belief that schools' low academic standards and "social promotion" practices were to blame for a perceived lack of high-level job skills (and of low-level skills as well—reports of high school graduates unable to read have fueled the fervor for minimum competency testing) among young high school graduates (Jaeger, 1982). The practice is not without a certain simple logic: if all it takes to earn a high school diploma is sitting in a classroom for 12 years, then schools and students have little incentive to ensure that substantial learning is taking place; consequently, a diploma is meaningless. Thus, minimum competency testing policies are intended to give meaning to the high school diploma by, as their name implies, ensuring a minimum level of proficiency in certain basic skills—generally Math, Reading, English, and sometimes Science, History, and/or Social Studies. In North Carolina, for example, the law enacting the minimum competency requirement states that the tests are intended "to assure that graduates of the public high schools . . . possess those skills and that knowledge necessary to function independently and successfully in assuming the responsibilities of citizenship" (General Assembly of the State of North Carolina, Art. 39A, §115-320.6 'Purpose,' 1977, quoted in Jaeger, 1982, p. 223).

The rhetoric underlying MCTs assumes 1) that proficiency can be scored one-dimensionally, at least within each individual subject area, and can be measured accurately with timed, multiple-choice "basic skills" tests; 2) that society and/or the workplace requires some minimum level of proficiency of graduates, a level that can be determined by some *a priori* defensible criteria; and 3) that withholding promotion and/or diplomas from students until they demonstrate the required standard of proficiency

will create a set of incentives for both schools and students to change in ways that will result in increased learning for those students who would otherwise be graduated without the required skills.

Each of these assumptions is questionable. The first reflects the troubled epistemology underlying modern testing practices, the idea that knowledge and learning are hierarchical and can be measured on a unidimensional scale ranging from "basic" to "advanced" skills (see Gould, 1981; Wolf, Bixby, Glenn, & Gardner, 1991; Wolf & Reardon, 1993). Without such an epistemology, the notion of "basic skills" would likely not even make sense. The second assumption is probably false, but essentially irrelevant—the usefulness of MCTs does not necessarily depend on how or why the cutoff scores are set. In practice, MCT cutoff scores and/or failure rates are determined more by political and economic forces than by *a priori* criteria (Eckland, 1980; Kreitzer, Madaus, & Haney, 1989; McDill, Natriello, & Pallas, 1987). Nonetheless, even if the passing scores are set purely by political/economic factors, the tests might still have positive effects if they do, in fact, raise the tail of the skill distribution above some minimum level.

This paper focuses solely on the third assumption, however, for it is around this assumption that most of the MCT policy debate has centered. The state legislatures and school boards that have adopted minimum competency testing argue that raising graduation standards—by increasing course requirements and conditioning grade promotion and/or graduation on the passage of standardized, machine-scorable, multiple-choice basic skills tests—creates incentives for low-performing schools and students to improve their performance. Opponents of minimum competency testing argue, however, that by creating additional hurdles for students to cross, the tests increase dropout rates rather than improving achievement (e.g. Darling-Hammond, 1991; Orfield, 1988). For low-achieving students,

particularly those in schools with inadequate resources and learning opportunities, opponents argue, the tests create more incentives to drop out than to improve achievement. Moreover, they claim, the negative effects of the tests are concentrated on those already at risk of dropping out—disproportionately minority and low-income students—a situation with serious equity and civil rights ramifications.

This paper focuses specifically on minimum competency testing in eighth grade, and examines both the prevalence of eighth grade minimum competency testing and its relationship to early high school dropout patterns. Throughout the paper, the term "minimum competency tests" refers specifically to tests that students must pass in order to be promoted from eighth to ninth grade. Though most students are subject to a variety of standardized, state- and district-mandated tests (United States General Accounting Office, 1993), the analysis here is restricted to these "high stakes" tests because they are the most likely to influence students' decisions to drop out of school.

The first part of the paper uses data from the 1988 NELS student and administrator surveys to describe the prevalence of minimum competency testing in public eighth grade schools, both nationally and among various population subgroups. In this section, I find that students in urban schools, in schools with high concentrations of low-income and minority students, and schools in southern and western states, are considerably more likely to have minimum competency test requirements in eighth grade. Among eighth graders, 35% of Black students and 27% of Hispanic students are subject to at least one minimum competency test in order to advance to ninth grade, compared to 15% of White students. Similarly, 25% of students in the lowest socioeconomic (SES) quartile, but only 14% of

those in the top quartile, are subject to eighth grade MCT requirements. This uneven distribution of MCT requirements may simply mean that the prevalence of MCTs is related to the prevalence of lower-achieving students—the group proponents believe the tests are most likely to help. But it raises an important concern as well: if MCTs do influence some students to drop out who would not have otherwise, then not only are MCT policies harmful, but their harmful effects are disproportionately concentrated on those students with the fewest opportunities for success.

The second part of the analysis examines the relationship between MCT requirements and early high school dropout patterns. Using longitudinal data from the 1988 and 1990 NELS surveys, I test whether students who were required to pass one or more MCTs in eighth grade in 1988 were more likely to have dropped out of school two years later (by 10th grade) than students who were not required to pass an eighth grade MCT. In this section, I find that in schools with high concentrations of low-SES students, MCT graduation requirements are linked to sharply higher dropout rates. Drop-out rates from low-SES eighth-grade schools with MCT requirements are two to six percentage points higher, on average, than those from otherwise similar schools with no such requirement. Furthermore, the my analysis of the NELS data also suggests that it is the concentrated poverty of these schools and their communities, and their concomitant lack of resources, that link MCT policies to higher dropout rates, rather than other risk factors, such as student grades, age, attendance, and minority group membership. Once their socioeconomic composition is taken into account, schools with below average student grades, low attendance rates, and high concentrations of minority students and students who are above age for their grade display no further systematic relationship between MCT policies and dropout rates.

While the nature of the NELS data makes it impossible to draw definite conclusions about the causal nature of these relationships, the evidence suggests that eighth grade minimum competency promotion requirements raise dropout rates among students in low-SES schools. Because students in low-SES schools are two to three times more likely to be required to pass MCTs in eighth grade than those in high-SES schools, and in the absence of solid empirical evidence of any other benefits resulting from minimum competency testing (to my knowledge, at least), this study supports those who argue that educators and policymakers should abandon minimum competency promotion practices in favor of educational strategies that do more to support student learning and to help students stay in school.

The Demographics of Eighth Grade Minimum Competency Testing

In 1991, Linda Winfield examined the characteristics of schools implementing eighth grade minimum competency tests in reading, using data from principals' responses to a survey administered in 1983-84 as part of NAEP. She found that eighth grade schools with MCT requirements in 1980 tended to be in disadvantaged urban areas, with high concentrations of minority students, and with less favorable teaching climates than non-MCT schools. However, because the response rate to the MCT question on the NAEP survey was only 51% (out of the 75% who returned the survey), Winfield's results must be considered tentative (Winfield, 1991).

The NELS 1988 survey enables me to both update Winfield's findings and improve on their reliability. A stratified random sample of 801 public eighth grade school administrators were surveyed by NELS in 1988; 795 (99%) responded to a series of questions asking whether students were retained in the eighth grade for failing minimum competency tests in math, reading, science, english, history, and/or social studies. In addition, NELS collected considerable demographic information on each school. This high response rate allows me to generalize with considerable confidence about national patterns of MCT prevalence in eighth grade public schools.

Of these 795 schools, 162 (20%) reported having at least one MCT requirement for promotion to ninth grade. Most eighth grade schools with MCT requirements, however, required students to pass more than one such test to be promoted: 90% gave at least 2; 65% gave at least 3; and 13% required students to pass MCTs in 6 subjects. Among schools that gave MCTs, Math, Reading, and English were the most common (see Table 1).

TABLE 1: Incidence of Minimum Competency Testing and Retention Policies in Public Eighth Grade Schools, 1988

	Weighted Percent (N = 795)
MCT in at least one subject:	20
MCT in Math:	18
MCT in Reading:	17
MCT in English:	13
MCT in Science:	6
MCT in History:	6
MCT in Social Studies:	6
Students retained for failing a required course:	55

Eighth grade MCT policies are related to several other retention policies. Among schools that retain students for failing a required course, MCT requirements are more common—25% of such schools have MCTs, as opposed to 14% of those that do not retain students for failing courses (Chi-square=14.597; DF = 1; p-value<0.001). And in states that require all students to pass MCTs in order to graduate from high school, eighth grade schools are more likely to use MCT for promotion as well—30% of eighth grade schools in states with high school MCT policies had their own MCT requirements, compared to 15% of schools in states without high school MCT graduation policies (Chi-square=25.753; DF=1; p-value<0.001).

Although high school MCT requirements are often set at the state level, no state requires eighth grade schools to use MCTs to make grade promotion decisions. Instead, eighth grade MCT

policies are set at the district or school level. Though the NELS sampling design makes it impossible to generate reliable estimates of the prevalence of eighth grade MCTs within particular states from NELS data, a state by state breakdown of schools in the NELS sample reveals no states where eighth grade MCTs were required in all schools within that state. Apparently, local conditions more than state policy influence the presence of MCT requirements in eighth grade.

TABLE 2: 1988 Eighth Grade MCT Requirements, by Region and Type of Community (weighted percentages)

	(schools)		(students)	
	% w/ MCT	avg. # of MCTs[a]	% w/ MCT	avg. # of MCTs[a]
Northeast	16%	2.5	16%	2.3
North Central	10%	2.5	11%	2.8
South	29%	3.7	29%	3.4
West	23%	4.0	17%	3.7
	(Chi-Square=33.663; DF=3; p-value<0.001)		*(Chi-square=673.3; DF=3; p-value<0.001)*	
Urban	36%	2.8	30%	2.9
Suburban	17%	3.1	14%	3.4
Rural	18%	3.9	21%	3.4
	(Chi-Square=20.999; DF=2; p-value<0.001)		*(Chi-square=403.8; DF=2; p=value<0.001)*	

[a] average number of MCTs required applies only to those schools with MCTs

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Though NELS does not allow state by state estimates of eighth grade MCT prevalence, regional estimates and urban/suburban/rural breakdowns are possible. The data show that schools with

eighth grade MCT policies are concentrated in the South and West of the U.S. Table 2 describes the distribution of MCT policies in eighth grade schools in different regions of the country and types of community. Generally, students in southern and western states and in urban schools are subject to eighth grade MCT policies at about double the rate of students in other areas (see Figure 2).

TABLE 3: Weighted Means of Selected Eighth Grade School and Student Characteristics, by 1988 MCT policy

	MCT	no MCT
Student Composition		
% White, not Hispanic	60.9	82.9****
% Black, not Hispanic	23.2	8.3****
% Hispanic, any race	12.7	5.8****
% free lunch eligible	40.1	25.2****
% LEP eighth graders	1.4	1.1***
% in remedial reading	13.8	9.6****
% in remedial math	11.4	6.2****
% in bilingual ed.	2.3	0.9**
% in ESL classes	2.6	0.8****
% in special ed. classes	7.4	7.3
% in gifted/talented classes	5.7	5.9
Other Characteristics		
total school enrollment	583	467****
eighth grade enrollment	131	139
days in school year	178.6	179.3
eighth grade attendance rate	92.8	94.0**
% faculty with adv. degrees	45.8	43.5
% minority faculty	22.9	8.8****
student-teacher ratio	16.8	16.1

* p<=.05; ** p<=.01; *** p<=.001; **** p<=.0001

Table 3 presents mean values (weighted to compensate for the sampling procedure) of a number of characteristics of eighth grade schools with and without MCT requirements. Eighth grade schools which couple minimum competency tests with grade promotion, on average, enroll substantially larger proportions of Black, Hispanic, and low-income students than schools without MCTs, and slightly larger proportions of LEP students. Students in these schools are more likely to be in remedial reading and math courses, more likely to take ESL or bilingual classes, and have slightly lower attendance rates than students in non-MCT schools. Finally, MCT schools tend to be larger and have substantially more minority faculty.

TABLE 4: Incidence of 1988 Eighth Grade MCT Requirements, by Students' Race and Social Class (weighted percentages)

	% of students taking MCTs	avg. # of MCTs[a]
White, not Hispanic	16%	3.5
Black, not Hispanic	35%	2.9
Hispanic, any race	27%	3.1
American Indian/Alaskan Native	37%	2.3
Asian/Pacific Islander	15%	3.0
(Chi-Square=631.0; DF=4; p=value<0.001)		
Top quartile SES	14%	3.3
3rd quartile SES	18%	3.3
2nd quartile SES	21%	3.2
Bottom quartile SES	25%	3.2
(Chi-Square=190.1; DF=3; p=value<0.001)		

[a] average number of MCTs required applies only to those schools with MCTs

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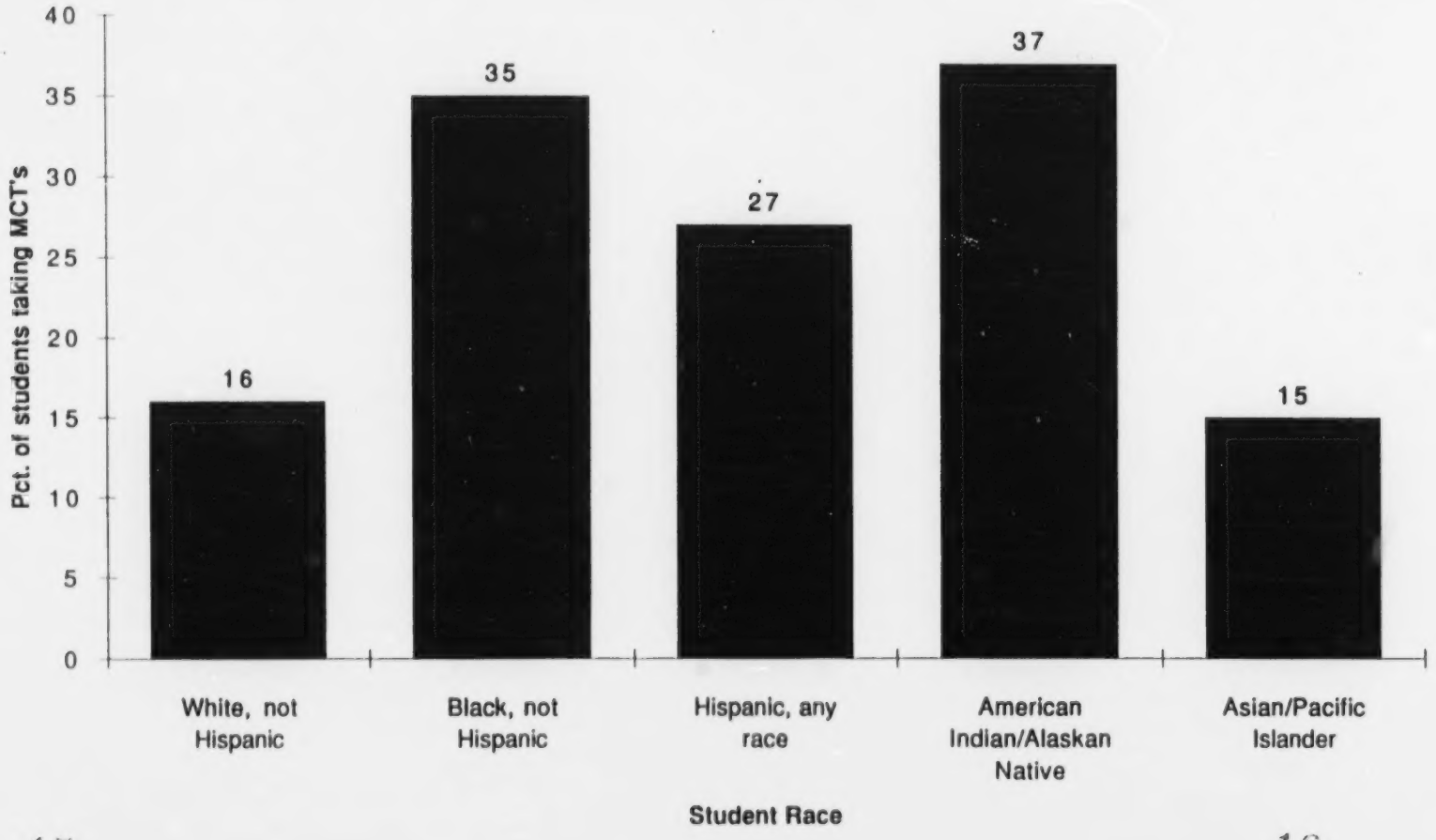
It is clear from these tables that minority and low-income students are most likely to be subject to eighth grade minimum competency tests. In public schools nationwide, 35% of Black eighth graders and 27% of Hispanic eighth graders are subject to MCT requirements, compared to 16% of White eighth graders; moreover, 25% of eighth graders from low-SES families, against 14% of those from high-SES families, must pass the tests to advance to ninth grade (see Table 4 and Figures 1 and 2).

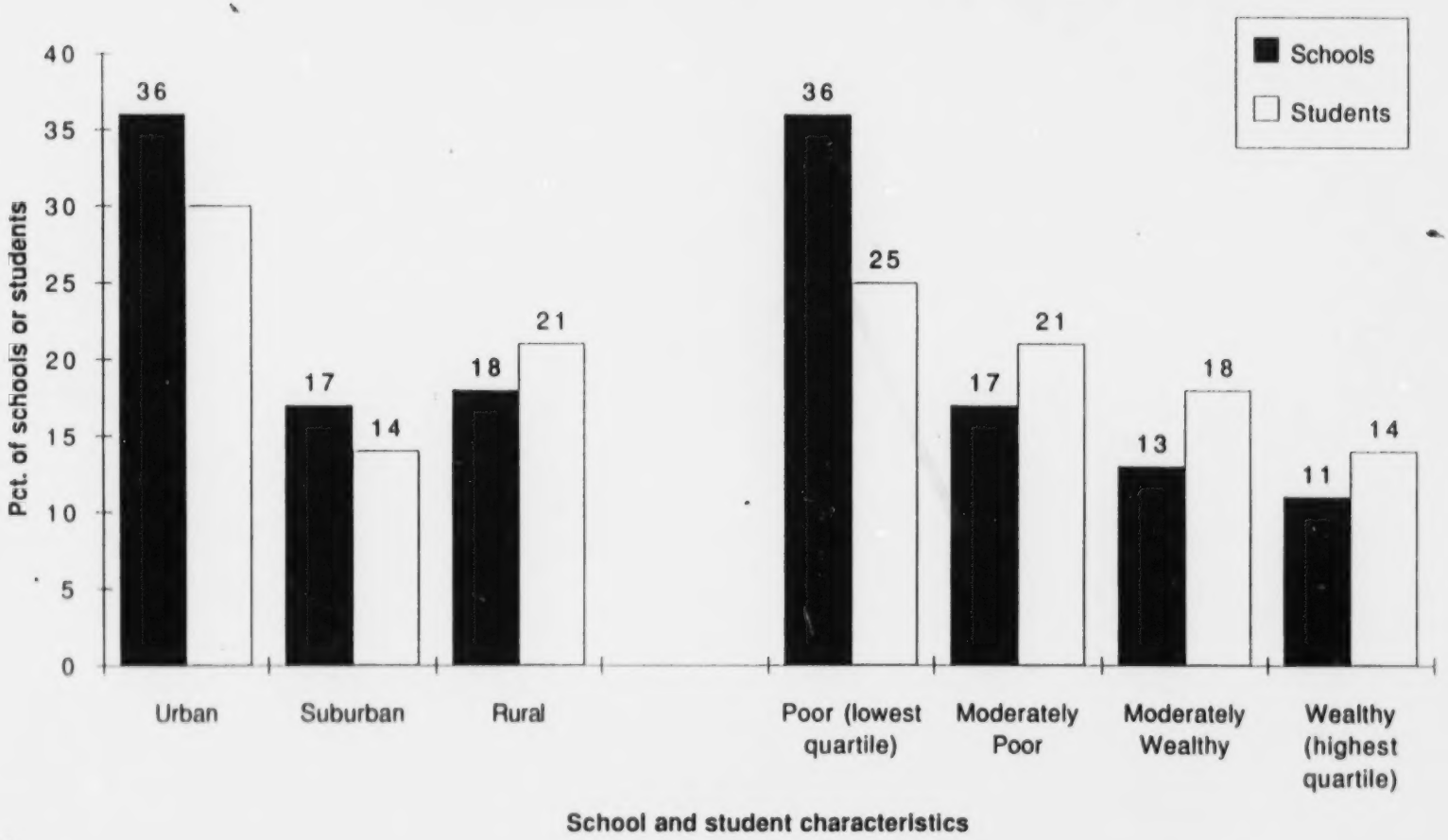
In general, the estimates generated from NELS of the prevalence and distribution of MCT requirements echo the general pattern described by Winfield (1991): MCT requirements are more common in urban schools and in schools with high concentrations of minority and low-income students. However, Winfield found that 53% of all eighth grade schools responding to the NAEP survey questions about MCT policy had MCT programs. This figure is substantially higher than the 20% figure reported by eighth grade administrators in NELS. One explanation for this difference may be the low response rate of the NAEP survey (38%) compared to the high response rate of NELS (99%), an explanation which suggests the lower NELS figure is more accurate. Another possibility is that the prevalence of MCT practices declined sharply between 1980 and 1988, but this is unlikely, as most other evidence shows no evidence of a decline in the popularity of minimum competency testing. A third explanation is that the NAEP questionnaire used a broader definition of minimum competency testing than NELS. Many states and districts use minimum competency testing to place students in remedial classes (Jaeger, 1982); the NAEP data may reflect this kind of testing as well as that used for grade promotion. In any case, the high response rate of the NELS survey should lend a high level of confidence to the numbers reported in Tables 1-4 above, regardless of the reason for their disagreement with the earlier NAEP data reported by Winfield.

FIGURE 1: INCIDENCE OF 1988 8TH GRADE MCT REQUIREMENTS, BY STUDENT RACE



(Source: NELS 1988 data)

FIGURE 2: INCIDENCE OF 1988 8TH GRADE MCT REQUIREMENTS, BY SCHOOL AND STUDENT LOCATION AND SOCIOECONOMIC STATUS



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(Source: NELS 1988 data)

The Relationship Between Minimum Competency Testing and Dropping Out

In addition to providing descriptive statistics on the demographics of students required to pass minimum competency tests for promotion to high school, this study aims also to determine whether there is a relationship between eighth grade MCT requirements and early high school dropout patterns. Are students in schools with MCTs more likely, on average, to drop out by tenth grade than those in schools with no MCTs?

Prior Research and Evidence

The sketchy literature on the relationship between MCTs and dropout patterns is predominantly speculative, often based on indirect evidence, and overwhelmingly inconclusive. Most of the literature assumes a loose chain of reasoning connecting MCTs to dropout patterns that goes something like this: MCTs add an extra requirement for promotion or graduation; consequently, low-achieving students may be discouraged from trying to pass, or they may become discouraged if they fail and are retained in grade, possibly leading them to give up on school and drop out. By citing research that supports one or another of these premises (e.g., research showing that retention in grade increases the likelihood of dropping out), a number of writers make the case that MCTs increase dropout rates, despite the lack of direct evidence. An even more speculative vein of the literature argues the opposite, however: by making promotion and graduation standards clear, some have argued, MCTs result in increased student motivation and lower dropout rates. A review of literature on the subject indicates that neither of these positions is grounded in empirical evidence.

In 1989, Amelia E. Kreitzer, George F. Madaus, and Walt Haney could find only five ERIC entries, among the thousands dealing with dropouts or minimum competency testing, that examined the effect of MCTs on dropouts (Kreitzer, Madaus, & Haney, 1989, p. 130). Thus, in order to evaluate the effects of MCTs on dropping out, they linked evidence of the effects of MCTs on self-esteem, grade retention, and curricula with research on the relationship between self-esteem, grade retention, and curricula on dropping out. After reviewing this mostly indirect evidence, they conclude that, while there is no evidence to suggest that MCTs decrease dropout rates, "MCTs may give students at risk of dropping out an extra push out of the school door. . . . [but] the fact is that we simply do not know" (P. 146). They do note one study that suggests that MCTs increase dropout rates: a study in New York City found that students retained in 7th grade by MCTs performed no better than similarly scoring students who were not retained, but they dropped out at higher rates--23% compared to 16% (from an unpublished 1986 New York City Board of Education report, cited in Kreitzer, Madaus, & Haney, 1989, pp. 139-140, note 40).

Edward L. McDill, Gary Natriello, and Aaron Pallas (1987) take a similar approach in evaluating the consequences of a number of standard-raising policies of the 1980s, including toughening the academic content of courses, requiring more time and coursework of students, and using competency testing for grade promotion and graduation. They point to a substantial body of research indicating that raised standards may discourage those students already at risk of dropping out even more, noting that "when students perceive school performance standards as unattainable, they are more likely to become disengaged from high school" (p. 121). Nonetheless, like Kreitzer, Madaus, and Haney, their evaluation of MCTs' dropout effects rests on a review of prior literature related to, but

not directly about, minimum competency testing. In the end, they conclude that, although MCTs have the potential to increase dropout rates, particularly for minority students and students from low-income families, there is no clear evidence to prove that this is the case.

Both of these review articles speculate that local variations in the implementation of MCT policies—in the level of standards set, the rigor with which they are applied to all students, and particularly in the availability of effective remedial programs for students at risk of failing the tests—are likely to shape the ultimate effects of such policies.

Because minimum competency testing arose as part of the excellence movement, it is closely linked with other policies designed to raise educational standards, most notably increased course requirements. Several studies look at the relationship between raising standards and dropout rates. Clune (1989) found that although a majority of administrators and school personnel said that increased course requirements in their schools had raised dropout rates, there was no evidence to support this. In addition, Clune cites three studies that show associations between raised graduation standards (not necessarily MCTs, however) and *lowered* dropout rates. These studies, however, are far from conclusive, as Clune acknowledges. Bryk and Thum (1989) merely describe the fact that higher graduation standards are statistically related to lower dropout rates; the others (Dade County Public Schools, 1988; Ginsberg, Noell, & Plisko, 1988) only note that as graduation standards (increased course requirements as well as MCTs) have increased, dropout rates (locally or nationally) have decreased. None is sufficient to establish a causal relationship between increased graduation requirements and reduced dropout rates. Finally, Clune (1991) finds that increased course-taking by students did not increase dropout rates, though he does not attribute the rise in course-taking solely to

state graduation policy requirements, but sees it as a consequence of many influences, consistent with national trends and not confined to the four states examined in the study.

One of the few studies to provide empirical data on the relationship between MCTs and students' dropout decisions is a study by James S. Catterall based on interviews with educators, administrators, and high school students (Catterall, 1989). Catterall reports that, while school administrators tend to believe that high school MCTs are so easy that they pose no real threat to graduation, and while most students tend to believe that MCTs are beneficial, those students who fail the tests at least once are considerably more likely than those who pass to report that they may drop out of school prior to graduation, even after a number of other academic variables are controlled for. Catterall's results suggest that MCTs pose no threat to most students, but among those who fail them, they increase a sense of discouragement and contribute to the likelihood of dropping out. The study also highlights the difference between the largely speculative beliefs of educators about the effects of minimum competency testing and the experiences of the students who must take them.

One drawback of each of these articles is that they are not based on longitudinal studies—Catterall, for example, reports on students' beliefs about the likelihood of their dropping out in the future, but has no data on whether they actually do drop out. And Kreitzer, Madaus, and Haney report that the 10 states with the highest 1986 high school attrition rates all had high school MCT requirements, while none of the 10 states with the lowest rates had such requirements. Such correlative data, while suggestive, does not prove causality.

What debate there has been about the merits of MCTs has occurred in an empirical vacuum. A summary of the literature to date can only echo the conclusion of McDill, Natriello, and Pallas in 1987, which in turn echoed Jaeger's 1982 summary of the literature:

> In the absence of any systematic evaluative studies of the effects of MCT programs on at-risk students, Jaeger's conclusion would appear to remain applicable: "In predicting the consequences of competency testing for students and teachers, we must be content for the moment with speculation rather than evidence." (McDill, Natriello, & Pallas, 1987, p. 121, quoting Jaeger, 1982, p. 241)

The purpose of this paper, then, is to illuminate this debate with some empirical evidence. In contrast to the existing literature on MCTs and dropping out, this paper, because it is based on longitudinal student data beginning in eighth grade, is able to report on actual dropout patterns following eighth grade MCT taking. In addition, while very little research, either within the dropout literature or the MCT literature, has examined the effects of middle-school MCT promotion requirements, this study focuses on eighth grade MCTs, and so may contribute to an understanding of the factors that influence students to drop out of school early in high school.

Methodology

Ideally, a study of the relationship between MCTs and dropout patterns would randomly assign students to MCT and non-MCT groups, noting which of those in the MCT group fail the test, and then looking for systematic differences in dropout patterns among the groups of non-takers, takers/passers, and takers/failers.

This study is, however, less than ideal in three important ways. First, because random assignment experiments are, at best, difficult to engineer, and fraught with ethical dilemmas, this study instead uses naturally occurring variations in MCT polices as a kind of natural experiment. NELS students were not, of course, randomly assigned to MCT or non-MCT schools. Rather, as is clear from the first section of this paper, MCT policies are systematically related to certain school characteristics, so that some students are more likely to take MCTs than others. For example, schools with higher concentrations of minority students, schools in the southern and western U.S., and schools with high concentrations of students from low-income families are more likely to have MCT policies. Because these characteristics are also related to dropout patterns, it is important to control for as many school and student characteristics as possible, in order to minimize selection bias. Nonetheless, it will be difficult to establish a causal relationship between MCT policy and dropout patterns. Do MCTs affect students' decisions to drop out, or do school systems with high dropout rates tend to implement MCTs? Or, are both MCT practices and dropout rates determined by a different set of school characteristics? At the end of this paper I explore the issue of causality more thoroughly.

Second, the NELS dataset on which the analyses are based does not contain data about students' success on MCTs. Unlike Catterall's (1989) study, which distinguished among students who passed, failed, failed and then passed, and never took an MCT, NELS does not contain data on whether individual students who took MCTs failed them. We only know which students were in schools requiring MCTs in eighth grade. We also know which students were no longer in school in 1990 and, for most of the students, whether they were retained in grade at any time between the 1988 and 1990 surveys. Not knowing whether individual students passed or failed an eighth grade MCT

means that this study can only explore the effect of *taking* an eighth grade MCT on dropping out, not the effect of *failing* an MCT. This distinction is important, and because for many students the tests likely pose no threat, lumping together all students who take the tests, passers with failers, will tend to underestimate any dropout effect associated with failing an MCT.

Third, NELS used a multistage stratified sampling procedure—a sample of schools was selected from the universe of eighth grade public schools, and then a sample of students was drawn from each of those schools. To the extent that students within a particular school are similar, or that their achievement and dropout patterns are influenced by their particular school, statistical analyses that treat each student as an individual case will overestimate the strength of relationships among variables because there are not really as many degrees of freedom in the data as there are students. In order to avoid such misleading results, this analysis uses each eighth grade school as a single observation and looks for relationships between various aggregate school characteristics and the percentage of students who drop out by tenth grade. Because collapsing the sample in this way will tend to underestimate the relationships among variables, it has the advantage of reducing the risk of false positive results due to the hierarchical sampling design, and thus we can be relatively certain that those relationships we discover are not the result of sampling design.

Data and Analysis

Using data from the 1988 and 1990 NELS surveys, this analysis uses multiple regression (with sample design and weighting taken into account) to look for a relationship between schools' eighth

grade minimum competency testing policies and the dropout rates of their eighth grade cohorts in the two years following eighth grade.

Data

The analyses are based on a nationally representative sample of 720 eighth grade public schools. The data set was constructed as follows: of the 801 public eighth grade administrators surveyed in NELS, 795 answered a series of questions about MCT policies. 790 of these schools had at least one student who was in the NELS longitudinal panel—that is, a student who was surveyed in 1988 in eighth grade and then located and surveyed again in 1990. Only schools with students in the longitudinal panel were included in the following analyses because dropout information was available only for those students. The 790 schools (98.5% of the 801 total) had a total of 14,191 such students, each of whom completed a NELS survey in both 1988 and 1990.

For each of these 790 schools, I constructed the following variables, using information from the 1988 NELS administrator survey and the 1988 and 1990 NELS student surveys. Variables taken from the administrator survey are marked with an asterisk. TOTSTU is simply the number of NELS longitudinal panel members in a particular eighth grade school. All other unasterisked variables are estimates of each school's student characteristics based on information provided by the students in the subsample of the NELS longitudinal panel from a particular school.

*MCTPOL	MCT policy dummy variable 0 = no MCT requirement for grade promotion 1 = school requires MCT in at least one subject for promotion;
*MCTNUM	number of subjects in which MCTs were required (range = 0-6)

*RETPOL	retention policy variable 0 = students not retained for failing a required class 1 = students retained for failing required class 2 = retention policy unknown
*STRATIO	student/teacher ratio of school
*URBAN	community type of school (rural, suburban, or urban)
*REGION	geographic region of school (northeast, north central, south, or west)
TOTSTU	number of students in NELS longitudinal panel
PCTDROP	percent of sample students dropped out by 1990
AVAGE	average age of sample students
AVSES	average SES of sample students, from NELS SES variable
PCTMIN	percent of sample students who are either non-white or Hispanic
PCTMALE	percent of sample students who are male
PCTLEP	percent of sample students with limited English proficiency
PCTSPAR	percent of sample students who live with single parents
AVGRADS	average GPA of sample students
AVTX	average standardized composite test score on NELS 1988 tests
AVGRPT	average number of grades repeated (K-8) among sample students
AVABS	average # of days reported absent in last month among 8th grade sample
PCTCUT	percent of sample students who report cutting classes in 8th grade

The school-level variables that are based on student data have values that are actually estimates of school characteristics (e.g. AVAGE is an estimate of the average age of students in the school, calculated as the weighted average age of students from that school who are in the NELS panel and for whom the relevant information was available). Because these estimates are suspect for schools with few students in the NELS panel (e.g., if only one student in a school is in the NELS panel, and s/he drops out, the school is estimated to have a 100% dropout rate), I eliminated all schools with fewer than 10 NELS panel students from my regression models (70 of the 720 schools, or about 9% of the schools, were eliminated this way). This has the effect of reducing the number of extreme outliers in

the regression results, because it reduces the variance in the values of the outcome and the predictor variables.[1]

The final sample on which the regressions are based, then, is a sample of 720 eighth grade public schools, each of which has at least 10 NELS longitudinal panel members.[2] If we accept that the 81 excluded schools (6 whose administrators did not respond to the MCT policy questions, 5 with no NELS longitudinal panel members, and 70 with fewer than 10 panel members) do not differ

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[1] Eliminating 9% of the schools carries with it the risk of biasing the parameter estimates in the regression results, if the eliminated schools differ systematically from the remaining schools. I performed two separate checks to ensure that the regression parameter estimates were not biased this way. First I plotted each of the variables against TOTSTU and looked for evidence that the schools with fewer sample students varied systematically from the others. I found that for most of the variables, though the average value did not differ vary much with the value of TOTSTU, the variance was much higher among schools with fewer than 5 or 10 sample members than for the remainder of the schools. For example, three schools, each with fewer than 5 sample members, showed 100% dropout rates. Such extreme estimates, based on very few students, are likely to skew the regression results considerably.

Second, I reran each of the regressions on four different subgroups of the 790 schools: 1) all 790 schools; 2) all 765 schools with 5 or more sample students; 3) all 720 schools with 10 or more sample students; and 4) all 630 schools with 15 or more sample students. The parameter estimates were roughly the same for all the subgroups except for the one with all 790 schools. In other words, it appears that the inclusion of the schools with few sample members, particularly the 25 schools with the fewest sample members, substantially affects the regression results.

Based on these tests, I decided to limit the sample of schools used in the regression analyses to the 720 schools with 10 or more sample members. While the variation between these schools and those with fewer sample members may, in fact, be due to real differences rather than error due to small sample size, I think the latter much more likely.

[2] The great majority of these schools had no missing values for any of the variables, but for those that did, missing values were imputed as follows:

PCTMIN:	missing in 2 cases; missing values set equal to the mean of nonmissing values
AVTX:	missing in 12 cases; missing values set equal to the mean of nonmissing values
AVABS:	missing in 1 case; missing value set equal to the mean of nonmissing values
PCTCUT:	missing in 1 case; missing value set equal to the mean of nonmissing values

systematically from the 720 remaining, then these 720 schools are a weighted representative sample of U.S. public eighth grade schools in 1988.

Analysis

A first look at the data reveals a clear relationship between eighth grade MCT requirements and early high school dropout patterns. Overall, students from eighth grade schools with MCT requirements drop out within two years after eighth grade at double the rate of those from schools without MCT requirements (8.8% compared to 4.2%). A breakdown by school SES shows that it is particularly in low- and moderately low-SES schools where MCT requirements are most related to dropout rates—dropout rates are four percentage points higher in poor schools with MCT requirements than in poor schools without them. In high- and moderately high-SES schools, MCT requirements have little or no relationship to dropout patterns (see Table 5 and Figure 3).

Of course, the relationships demonstrated in Table 5 do not prove that MCT policies cause higher dropout rates in low-SES schools, but they do suggest the importance of further investigation. Because MCT policy requirements are systematically related to a number of other school characteristics, such as racial composition and geographic location, that are also related to dropout patterns, a multiple regression model is required to clarify the relationship between MCT policy and dropout rates.

TABLE 5: Estimated Cohort Dropout Rates By Tenth Grade, by Eighth Grade MCT Policy and Socioeconomic Composition of Eighth Grade School, 1988-1990

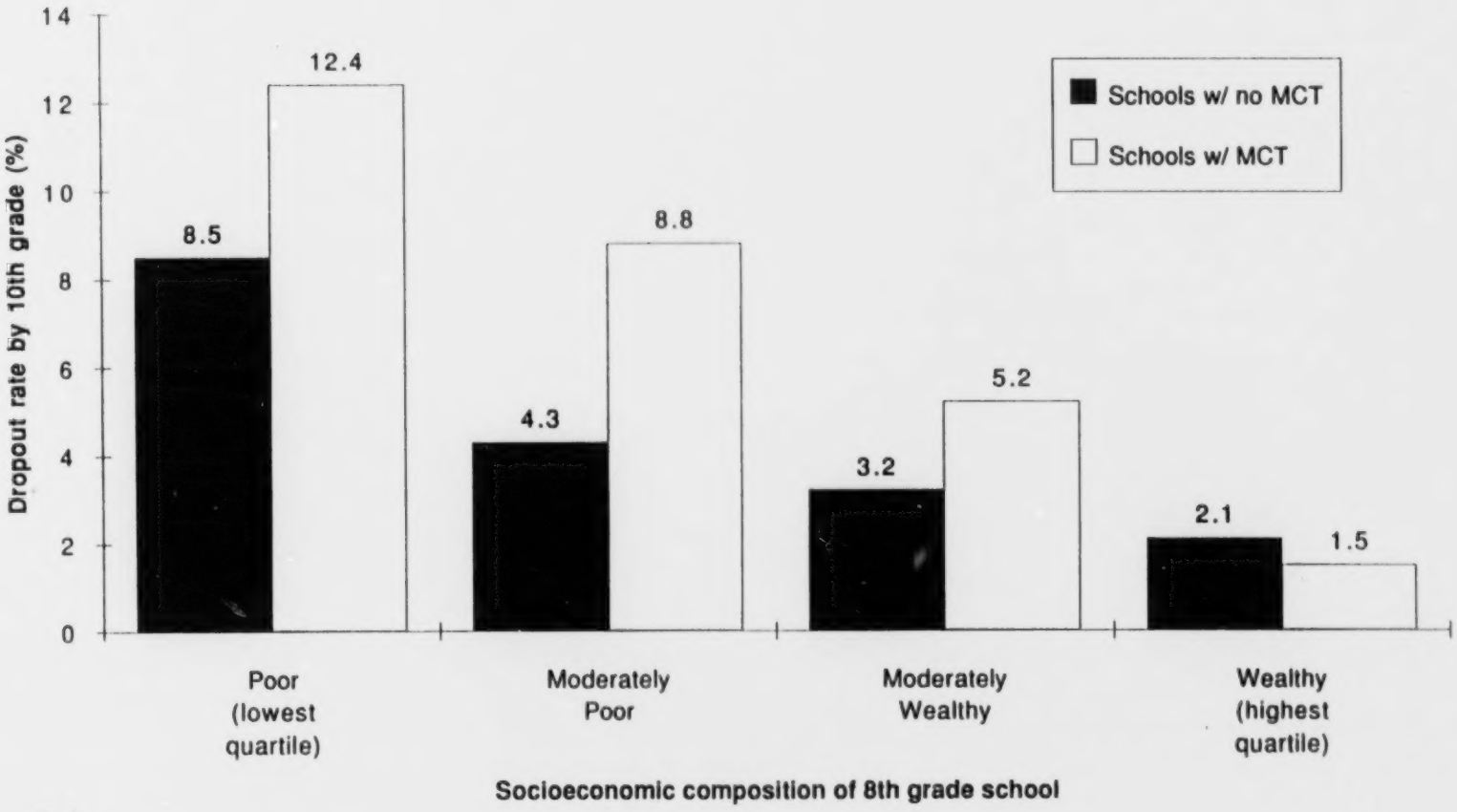
Average SES of School		Percentage of schools requiring MCTs	Dropout Rate by 10th grade: schools without MCT	Dropout Rate by 10th grade: schools with MCT
Poor (lowest quartile)	(N=155)	36%	8.5%	12.4% *
Moderately Poor	(N=122)	17%	4.3%	8.8% ***
Moderately Wealthy	(N=192)	13%	3.2%	5.2%
Wealthy (highest quartile)	(N=251)	11%	2.1%	1.5%
Total	(N=720)	19%	4.2%	8.8% ***

(asterisks indicate the significance level of the difference in dropout rates between MCT and no-MCT schools within a particular SES quartile. * p<=.1; ** p<=.01; ***p<=.001.)

Findings

Table 6 shows several fitted regression models with PCTDROP as the dependent variable. In each model, the SUDAAN statistical program was used to calculate regression coefficients and standard errors in order to account for the stratified probability sampling used to select the NELS sample of eighth grade schools. Initially, a control model was fit; in subsequent models variables describing MCT policies (MCTPOL and MCTNUM) and interaction variables were added to the

FIGURE 3: COHORT DROPOUT RATES BY 10TH GRADE, BY 8TH GRADE MCT POLICY AND SOCIOECONOMIC COMPOSITION OF 8TH GRADE SCHOOL, 1988-1990



(Source: NELS 1988-1990 data)

model. For each model, the residuals were examined for evidence of goodness-of-fit; in all cases they appeared satisfactory.

TABLE 6: Fitted Regression Models on PCTDROP

	CONTROLS	MODEL 1	MODEL 2	MODEL 3
R^2	.361	.374	.385	.391
INTERCEPT	-140.91***	-140.73***	-139.15***	-142.11***
Main Effects				
MCTPOL	-	2.13*	0.34	3.12
MCTNUM	-	-	-	-0.79
Controls				
AVAGE	10.99***	10.90***	10.76***	10.98***
AVSES	-3.17***	-2.91***	-2.09*	-2.01*
AVGRADS	-3.60**	-3.27**	-3.16**	3.16**
AVABS	1.90**	1.81**	1.82**	-1.86***
NRTHEAST	1.30	1.35	1.40	1.21
NRTHCENT	-2.04*	-1.85*	-1.78*	-1.93*
SOUTH	-0.24	-0.47	-0.31	-0.35
Interactions				
MCTPOL*AVSES	-	-	-5.11*	-4.87*

* p<= .05; ** p<= .01; *** p<= .001

The first model includes only control variables that are systematically related to dropout rates; all other predictors have been dropped from the model. Table 6 shows that students' age,

socioeconomic status, grades, and absenteeism rates are all important predictors of early high school dropping out. In addition, schools in the north central U.S. have, on average, dropout rates 2% lower than similar schools in the rest of the country.

Model 1 includes MCTPOL as a predictor, and shows a positive relationship between MCT requirements and dropout rates: after controlling for other variables, schools with MCT promotion requirements have dropout rates 2% higher, on average, than similar schools without MCT requirements. Adding MCTPOL to the model does not change any of the other parameter estimates substantially, and increases R^2 slightly, from .361 to .374.

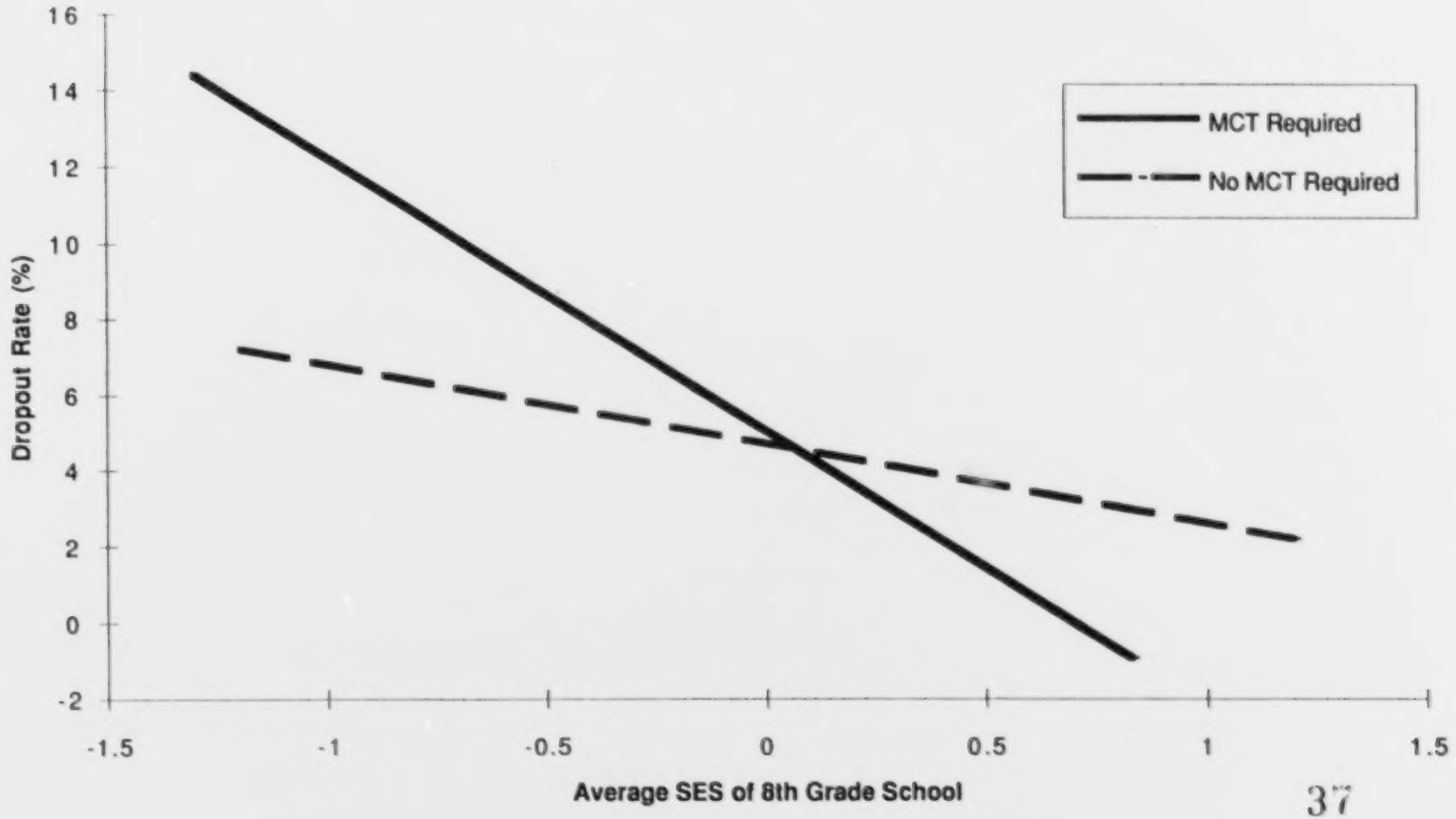
Model 2 is identical to Model 1 except for the addition of an interaction variable. Because MCTs are likely to have their most negative effects, if any, on students most at risk of dropping out, Model 2 was constructed by testing for the presence of interactions between MCT policies and the other main effects variables—AVAGE, AVSES, AVGRADS, AVABS. Also, to determine whether MCTs have racially disproportionate effects, Model 2 initially tested as well for an interaction between MCTPOL and PCTMIN. Only the interaction between MCTPOL and AVSES added to the explanatory power of the model, so the others were dropped. With the interaction included in the model, R^2 increases to .385. As Model 2 shows, MCT policies greatly increase the strength of the relationship between a cohort's average SES and its dropout rate. Among eighth grade schools with MCT requirements, the slope of the relationship between a school's average SES and its tenth grade dropout rate is more than three times what it is for eighth grade schools without MCT requirements. This means that in schools with eighth grade MCT requirements, the effect of the socioeconomic composition of the school on dropout rates is greatly increased. Another way of putting this is to say

that eighth grade MCT requirements have their most detrimental effects on students in poor schools, where the average difference in dropout rates among MCT and non-MCT schools is as high as 6%. In moderately wealthy and wealthy schools, in contrast, the presence of MCT requirements has no negative relationship to dropout rates, and even a positive one for the wealthiest schools (see figure 4).

Models 1 and 2 do not discriminate among schools with different numbers of MCTs, but instead treat schools with 1 MCT the same as those with 6 MCTs. In order to examine whether the number of MCTs is related to dropout patterns, Model 3 includes MCTNUM, a variable indicating the number of MCTs (0 to 6) students must pass for promotion to high school.

Including MCTNUM in the model does not add significantly to the explanatory power of the model. R^2 increases only very slightly, and the parameter estimate for MCTNUM ($B = -0.79$, p-value $= 0.13$) is small enough that we cannot reject the null hypothesis that $B = 0$. Thus, Model 2 appears to be the best model.

FIGURE 4: FITTED REGRESSSION LINES OF ESTIMATED COHORT DROPOUT RATES BY 10TH GRADE, BY 8TH GRADE MCT POLICY AND AVERAGE SCHOOL SES, 1988-1990



Discussion

The NELS data show a clear, if slightly complex, relationship between eighth grade MCT policies and early high school dropout patterns. In short, for students from low-SES eighth grade schools, there is a substantial positive relationship between MCT requirements and higher dropout rates, while in wealthy schools the relationship is reversed; wealthy schools with MCT policies average slightly lower dropout rates than those without MCT policies.

Other than this interaction effect between MCT policies and school SES, MCT requirements do not appear to have a disproportionately negative effect on minority students, or on students who are otherwise at higher risk of dropping out because of low grades, high absence rates, or having been retained in grade in the past—except, of course, to the extent that such students are disproportionately concentrated in low-SES schools. However, because these analyses rely on aggregated student characteristics, they may underestimate or obscure significant interactions among student characteristics and MCT policies.

Though the regression analyses reveal a relationship between MCT promotion requirements and dropout rates, they do not give clear evidence for the direction of causality. The question remains: do MCTs cause students to drop out, or do districts and schools with high dropout rates adopt MCT requirements disproportionately more often than those with lower rates?

One possibility is that eighth grade MCTs cause students to drop out more frequently or earlier than they might have otherwise. Those who argue this claim that MCTs, by retaining students, discourage them from continuing. They point to the substantial literature demonstrating that students who are retained are more likely to drop out than similar students who are not retained. The fact that

MCTs are generally easy enough that very few students are retained by repeatedly failing them—generally on the order of 2-6%—is in line with the average increase in dropouts due to MCTs of about 2%.

Moreover, evidence shows that students in poor schools fail MCTs at much higher rates than those in wealthy schools.[3] This may explain why the effect of MCTs varies with the average wealth of a school. The effort to raise standards in poor schools, particularly if not accompanied by remedial programs and other resources to help the students meet the higher standards, may discourage many students who fail the tests from continuing. In affluent schools, the tests are more likely to be accompanied by additional resources and remedial programs; this would help explain why dropout rates appear to be lower in wealthy schools with MCT requirements.

If eighth grade MCT requirements were set by state policy, as most high school MCT requirements are, we could be reasonably certain that the relationships observed between MCTs, SES, and dropout patterns were the result of MCTs causing differences in dropout rates. State level policy is relatively removed from local variations in school and district success, so we would have a situation closer to random assignment. But because eighth grade MCT requirements are almost universally set at the school or district level, the possibility that the causality runs the other way exists.

It is perhaps possible, for example, that among poor schools, those with higher dropout rates may be more likely to implement MCTs. The scenario might go something like this: a district is under public attack due to its poor test scores, high dropout rates, and low college-going rates. In response,

[3] For example, unpublished data from the Ohio Department of Education on that state's high school minimal competency testing program shows that students in poor urban districts fail MCTs at rates many times higher than students in affluent suburban districts.

the district implements an eighth grade MCT policy, requiring students to pass math and reading tests before entering high school, in order to convince the public that the schools are raising their standards. In reality, the tests are easy enough that they pose no threat to the vast majority of students; only those who would have dropped out anyway, for other reasons, are at risk of failing the tests. So the tests have no effect on dropout rates because they retain almost no one. Nonetheless, the public is convinced that the schools are doing something. In this scenario, MCT policies do not cause higher dropout rates but rather are due, at least in part, to high dropout rates and other perceived failures of a school or district.

One way to determine whether MCTs cause higher dropout rates or vice versa would be to eliminate from the sample all the students who were retained in 8th grade and then see if there were still a relationship between MCT policies and dropout rates. Presumably, if MCTs cause students to drop out, it is by retaining them in grade. If all retained students are eliminated from the sample and there is still a relationship between dropout rates and MCT policies, then we can probably conclude that MCTs do not cause an increase in dropout rates, because MCT requirements are unlikely to be responsible for dropouts among students who are not retained. If, however, there is no relationship after the retained students have been dropped from the sample, we cannot be sure that MCTs do cause an increase in dropout rates, because the elimination of the retained students skews the sample in important ways, but the evidence might be suggestive nonetheless.

Beginning with the original 14,191 students in 790 schools, I eliminated students who had been retained between the time of the 1988 and 1990 surveys. Unfortunately, NELS does not provide ideal data for this. For the students still in school, NELS only records whether they were at grade level (in

10th grade) in 1990, not whether they had been retained in eighth grade. Of the 13,721 students still in school in 1990, 598 (4%) were not in 10th grade and were dropped from the sample. Presumably, the rest had not been retained between eighth and tenth grades. Those not at grade level may have actually skipped a grade, but the vast majority of them had probably been retained either in eighth or ninth grade. Of the 742 dropouts, 346 reported in 1990 that they had not been retained in a grade since 1988; 179 reported that they had, and for 217 the information was missing. The 396 dropouts (53% of dropouts) who had been retained or for whom the information was missing were removed from the sample. This left 13,469 students in the sample, 346 of them dropouts, all of whom had not been retained in eighth grade.

For this group of students, I then constructed the same variables as I had done for the full sample, limited the sample to the same 720 schools, and ran the same regression models. For this sample, MCT policy had no relationship to dropout patterns in any of the regression models. In other words, among students who were not retained in eighth grade, dropout rates are no higher among those who were required to pass an MCT than those who were not, a finding that suggests, but does not prove, that it is MCT requirements which cause higher dropout rates, rather than vice versa.

Conclusion

Much of educational policy is driven more by hopes and ideology than by clear evidence of the educational benefits of particular policies. And while policy need not, and in fact should not, be entirely data-driven, our claims for the benefits or dangers of certain policies and practices must be grounded in real evidence, else we run the risk of harming those students we hope to help and of wasting time and

money that could be applied elsewhere with greater effect. Unfortunately, educational policy-making is often more about politics than about students, and debate often hinges more on simplistic beliefs about how the world ought to work than on evidence of how it actually does.

The polarized debate about the merits of raising standards by requiring students to pass minimum competency tests is an example of this kind of non-empirical policy making. Virtually no evidence exists about the merits or flaws of MCTs. In part, then, this article is intended to demonstrate the usefulness of using national survey data, such as NELS, to investigate the relationships between educational policy and student outcomes. While the NELS data leaves open somewhat the question of causality and so lacks the certainty that a random assignment experiment would have, it nonetheless adds considerably to our empirical knowledge of the subject, both in terms of which students are subject to the tests and what the relationship is between the tests and dropout patterns. As subsequent waves of NELS data become available, it will be possible to carry out other analyses such as these.

The evidence reveals that poor, minority, and urban eighth grade students—already the most systematically underserved students in U.S. schools—are disproportionately subject to MCT promotion requirements. Moreover, students in poor schools, particularly those in the poorest schools, and regardless of their school's racial/ethnic composition, appear to be most negatively affected by MCT requirements. Students in these poorest schools, when subject to MCTs, dropout at rates 4 to 6 percentage points higher, on average, than students in similar schools without MCTs. And while students in moderate SES or wealthy schools with MCT requirements appear to drop out at rates equal to and even lower, on average, than their counterparts in similar schools without MCT requirements,

such students are relatively few—only 12% of schools with above average SES have MCT requirements.

This analysis of NELS data provides supporting evidence for the many educators who have argued that minimum competency testing, by raising standards without providing additional opportunities for students to learn, has harmed students—and particularly students in poor schools—by discouraging them from completing high school. Taken together, the two most important findings of this study demonstrate the starkly inequitable effects of eighth grade MCT requirements. Black, Hispanic, and Native American students and students in low-SES schools are subject to eighth grade MCT promotion requirements at two to three times the rate of other students, and students in low-SES schools with MCT requirements drop out within two years at rates 2 to 6 percentage points higher than their counterparts in similar schools without eighth grade MCT requirements. These findings should caution educators and policymakers against relying on raising promotion and graduation standards in the hopes that it will unambiguously encourage students to learn more. In fact, such practices appear to have quite the opposite effect, at least on those students in schools with high concentrations of low-SES students.

These effects of MCT requirements prompt a final question: If MCT promotion requirements encourage students to drop out, particularly in low-income schools, why are these schools so much more likely to have implemented MCT requirements? What kind of perverse forces convince urban superintendents and school boards to adopt policies that hurt their students? The dynamics of such decision processes would probably make for some revealing case studies, but we can guess at their general themes: wishful thinking and politics. In the absence of empirical evidence to the contrary,

minimum competency testing has a certain convincing logic to it, particularly to those who do not work in schools or with adolescents. Children and teenagers do not live in the same world as adults, and the incentive systems that appeal to adults may not make sense to students. But without empirical evidence to convince them of the negative effects of MCT requirements, school boards, superintendents, and principals may adopt such policies in the hopes that they will be the magic bullet needed to restore the schools to glory.

The other appeal of minimum competency testing is its political expedience. Large urban school districts, which tend to have high concentrations of minority and low-income students, have been sharply criticized in recent decades and have felt strong pressure to demonstrate improvement. In an era of increased testing and calls for public accountability, minimum competency testing is a politically attractive strategy for beleaguered urban school boards and superintendents, giving the appearance, if nothing else, of raising standards while eliciting little or no opposition from teachers unions and general support from parents (Jaeger, 1982). Unfortunately, the adoption of MCT practices in these low-income, high-minority urban districts may have been something of a pact with the devil, for it appears that the political forces demanding quick and painless improvements in these beleaguered districts have driven them to impose on themselves, in the name of excellence and accountability, policies which have instead simply encouraged some students in the poorest schools to drop out.

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